

FINDING OF NO SIGNIFICANT IMPACT
TENNESSEE VALLEY AUTHORITY
THE REGENESYS™ ENERGY STORAGE SYSTEM DEMONSTRATION

The Proposed Action and Need

The Tennessee Valley Authority (TVA) has prepared an Environmental Assessment (EA) of a proposal to install and operate a Regenesys™ Energy Storage Facility in Lowndes County, Mississippi. This Finding of No Significant Impact incorporates the EA by reference. A copy of the EA is attached.

The Regenesys™ technology would operate by electrically charging two electrolyte solutions, sodium bromide and sodium polysulfide, and pumping them through separate circuits separated by a membrane, which would allow electrochemical reactions to occur, thus generating electricity. The facility is expected to store and release about 12 megawatts of electricity. The principal components of the facility would be:

- Regenerative modules located in a main-process building.
- Two electrolyte storage tanks.
- A process facility, including an electrolyte circulation system.
- A power conversion system, including an inverter/rectifier, transformer, and alternating current breaker.
- Control systems.
- Auxiliary systems that include electrolyte and power-conversion-system cooling, and an electrolyte management system.

The process building, approximately 175 feet long, 65 feet wide, and 60 feet tall, would contain the required modules, electrolyte circulation pumps, electrolyte supply headers, and associated pipework. The two large, cylindrical, double-walled electrolyte storage tanks (30 feet tall and approximately 65 feet in diameter) would be installed adjacent to the process building. A wall would be erected around the tanks to serve as a visual screen; the base of this screening wall would be concrete to serve as spill containment. The plant layout, including parking facilities, would cover approximately four acres. Minor modifications to the existing substation would be required to accommodate the electrical interface. The substation would be expanded, requiring a small amount of grading. The station fencing would be expanded and would probably be incorporated into the new fencing required for the Regenesys™ plant. Communications and control equipment would be installed at the Regenesys™ plant, the substation, and at several remote locations on the TVA system. All work at the remote locations would be within existing TVA facilities.

As described in Appendix D of the attached EA, complete Hazard and Operability Studies and design reviews have been performed to ensure the plant design minimizes the risks of releases of hazardous materials as far as is reasonably practicable. These reviews are in addition to the previous work performed by the company that developed the technology in Great Britain. In each scenario evaluated, the proposed design features minimize the possibility of a release caused by the occurrence of one of these events.

Construction would take approximately one year. The facility is expected to have a design lifetime of about 15 years but with proper maintenance and refurbishing could last considerably longer if needed.

The RegenesysTM facility is needed to demonstrate the potential of this new technology for energy storage. The demand for electric power fluctuates widely from season to season and throughout the day. Peaks in demand may only last for a few hours during a year, yet utility systems must maintain the capacity to meet these peaks. One way to improve power plant utilization and reduce expensive backup and peaking capacity is to store energy during periods of low demand for use during periods of high demand.

Also, some customers experience interruptions in their service due to the condition of the components supplying the power and/or their location in relation to the source of power providing the service. Currently, these conditions can only be corrected by adding or upgrading existing substations, transmission lines or both. These upgrades are costly. However, by storing energy in strategic locations throughout the system, these upgrades can be deferred for extended periods of time.

Under the National Energy Policy Act of 1992 (PL 102-486), TVA was directed to employ a least-cost energy-planning process for the addition of new energy resources to its power system. TVA completed this planning process in December 1995 with the publication of Energy Vision 2020 – Integrated Resource Plan/Programmatic Environmental Impact Statement (TVA 1995).

This planning process led to the development of long- and short-term action plans by TVA for identification and implementation of the best energy choices for current and future consumers. The short-term action plan calls for research and development programs. Specifically, the short-term action plan provides for “research on targeted applications of demand-side management, distributed renewable and non-renewable generation, and storage technologies to achieve transmission and distribution system benefits.” (TVA, 1995). The RegenesysTM project would be part of this plan.

The December 1995 Programmatic Environmental Impact Statement (EIS) considered the system-wide environmental impacts of the plan. The EIS called for site-and project-specific NEPA reviews of actions, such as the proposed RegenesysTM facility, that would be taken to implement the plan

Alternatives

TVA considered three alternative actions:

- Alternative A: install and operate the RegenesysTM facility on a portion of a privately owned mobile home park site adjacent to, and south of, the existing TVA substation at the Columbus Air Force Base (CAFB). About six acres of the park would be purchased for the facility, which would occupy about four acres. Another four acres adjacent to the purchased area would be used during the construction period for temporary construction facilities such as offices, parking, laydown and staging areas.
- Alternative B: TVA would construct and operate the RegenesysTM facility on about four acres of CAFB property, approximately 400 yards west of the substation. The site would include the two-acre site of the previous and now-demolished CAFB wastewater treatment plant .

- **No Action:** The RegenesysTM Energy Storage Facility would not be constructed. If this alternative were selected, TVA's need to demonstrate a promising new technology that has the potential to eliminate most problems associated with storing electricity would not be met. Current peak power demands and power quality concerns would probably be addressed by TVA's customary practices of using more conventional generating facilities and/or by adding or upgrading transmission lines.

If either Alternative A or B were adopted, the same basic facility would be constructed (with different orientations depending on the direction to the substation), and it would be operated in the same way.

TVA has chosen Alternative A as the preferred alternative. With the mitigation described below, TVA has determined that Alternative A would have no significant impacts on the quality of the environment, and it would be from \$200,000 to \$400,000 less expensive to build the facility on the Alternative A site due to better foundation conditions and a direct overhead connection to the adjacent substation.

Impact Assessment

An interdisciplinary TVA team reviewed the potential direct, indirect and cumulative effects of the construction and operation of the proposed facility. In evaluating Alternative A, the following environmental issues were assessed in the attached EA and were determined to have insignificant environmental impacts, even without mitigation measures: impacts on land use; air quality; socioeconomic resources; water resources; infrastructure and utilities; earth resources; hazardous materials and wastes; historic structures, historic sites, and archaeological resources; biological resources; and environmental justice. However, without mitigation measures, impacts of noise and visual and aesthetic impacts would be significant.

Construction of the facility would generate sufficient noise that the nearest mobile home to the facility site would experience noise levels high enough to cause speech interference, and all residents of the mobile home park living within 400 feet of the facility site (about 26 residences) would experience lower noise levels capable of causing temporary disturbance and annoyance. Operational noise, primarily from cooling tower fans, would occur throughout the day, including evening and nighttime hours., and would increase the DNL by 3dB inside the nearest mobile home. An increase of this magnitude would generally be noticeable and could disturb the sleep of the residents. TVA has determined that unless the mitigation noted below were applied the impacts of construction and operational noise would be significant.

Construction of the facility would adversely affect the visual landscape. Due to the bulk, height, and industrial look of the facility, TVA has determined that this change would be significant unless the mitigation noted below were applied. Visual impacts of operation, such a plume of water vapor and nighttime lighting, would be minor and not need special mitigation.

Mitigation

In implementing Alternative A, TVA's Public Power Institute, as the builder and operator of the RegenesysTM facility, will implement the following mitigation measures to reduce impacts to an insignificant level:

Noise:

- Carry out construction only during daylight hours, when residents are less likely to be home, to minimize interference with speech, disturbance, and annoyance.
- Install an acoustic enclosure around the tower to reduce noise emissions from the cooling tower. This would lower emitted noise 5 to 8 dBA, prevent sleep disturbance, and eliminate significant contribution to the ambient noise level.

Visual and Aesthetic:

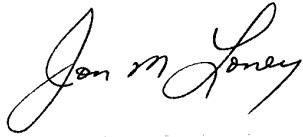
- Protect existing vegetation along the north and northeast to maintain the limited visual buffer and ground level screening.
- Locate the construction facilities generally south and southwest of the plant to avoid disturbing the vegetation buffer.
- For the main building and screen wall, use architectural materials and colors similar to those preferred for new community facilities on CAFB. Brick color could be flexible, moving toward a light gray-brown. At least one story of brick and the upper three of dark metal would provide optimum compatibility with CAFB structures nearby, and the least visual contrast with the proposed reforestation on-site. To the greatest extent practical, enclose lower industrial elements such as the cooling tower, tanker bays, and related yard features within the screen walled area.
- Utilize architectural details to divide the large building surfaces into a series of smaller forms that would reduce the visual impact of their mass, as noted for CAFB.
- Establish woodland reforestation around the plant as the final task of construction clean up and reclamation. Plant all undeveloped portions of the site with trees, using a mix of 60 percent evergreen and 40 percent deciduous species. To be effective, several rows of trees 10 to 12 feet high will be planted along the site perimeter, and trees 4 to 6 feet high will be planted to fill interior areas up to the plant.
- Provide supplemental evergreen planting for ground level screening and increased buffer density for the closest residential units and CAFB. This visual screening will be immediately beneficial while reforestation matures over time. To be most effective, plants at least 8 feet high will be densely spaced and located as close as reasonable to the selected residences and sections of the CAFB boundary.

Public and Intergovernmental Review

The draft EA was provided to the public, and to an extensive list of federal, state, and regional governmental agencies as noted in Chapter 6 of the attached EA. A notice of its availability was printed in the Columbus News Standard on June 13, 2001. No comments were received from the public. Summaries of comments received from the governmental agencies and TVA's responses are summarized in Appendix E of the attached EA. In conformance with Section 106 of the National Historic Preservation Act, TVA determined that the project would have no effect on historic structures, historic sites, or archaeological resources, and provided this determination to the State Historic Preservation Officer (SHPO) for comment. The SHPO concurred in this determination, as noted in the letter contained in Appendix E of the EA. The Choctaw Nation stated, also as noted in a letter contained in Appendix E of the EA, that they were unaware of any culturally sensitive or sacred sites in or near the project area.

Conclusion and Finding

Environmental Policy and Planning's NEPA Administration staff reviewed the attached Regenesys™ Energy Storage System Demonstration EA and determined that the potential environmental consequences of TVA's proposed action (Alternative A) have been addressed. Based on the findings in the EA, including implementation of required mitigation, we conclude that the proposed action is not a major federal action significantly affecting the quality of the environment. Accordingly, an environmental impact statement is not required.



Jon M. Loney
Manager
NEPA Administration
Tennessee Valley Authority

August 29, 2001

Date